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CENTRAL INTELLIGENCE AGENCY

REPORT

CD NO.

50X1-HUM

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COUNTRY Yugoslavia

SUBJECT Transportation - Rail

DATE OF INFORMATION 1945 - 1949

DATE DIST. 21 Oct 1950

NO. OF PAGES 12

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SUPPLEMENT TO REPORT NO.

THIS IS UNEVALUATED INFORMATION

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REPORT ON THE YUGOSLAV RAILROADS AS OF 10 OCTOBER 1949

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The Railroad Situation from 1 April 1945 to the Present

The opening of the Youth lines and other new railroads has not greatly changed the length of usable railroad track in Yugoslavia. The second track of the Zemunski Most - Novska railroad line is not in service because of a shortage of track materials. This deficiency has not as yet been completely corrected.

In comparison with the prewar period, the maintenance of track equipment, rolling stock, and workshop and railroad yard installations is excellent. The reason is simply that every difficulty in railroad transportation is investigated by the UDB.

Certain sources say that Yugoslavia now has about 5 percent more locomotives and about 12 percent more railroad cars than before the war. This increase in rolling stock is the result of the confiscation of foreign locomotives and railroad cars on Yugoslav territory, reparations, purchases, and domestic production.

Today Yugoslavia has approximately 2,520 standard-gauge locomotives, 11,000 passenger cars, and 45,600 freight cars. No changes have been noted in the two types of narrow-gauge railroads.

Yugoslav Railroad Lines

a. Standard-gauge Double-track Lines

1. Spilje - Maribor - Zidani Most - Ljubljana - Rakek - Trieste

2. Zidani Most - Zagreb

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3. Belgrade - Novska; at present this line provides only single-track service, as the rails of the other track have been removed and used as replacements in existing lines or in building new lines

4. Lapovo - Velika Plana

5. Belgrade - Resnik

b. Standard-gauge Single-track Lines

1. Djevdjelija - Gracko - Veles - Skoplje - Kocane - Nis - Stalac - Paracin - Lapovo - Velika Plana - Topcider - Belgrade

2. Skoplje - Urosevac - Kosovska Mitrovica - Raska - Rankovicevo - Kragujevac - Lapovo

3. Bitolj - Prilep - Bogumila - Veles

4. Veles - Stip - Kocane

5. Pec - Obilicevo - Pristina - Kursumlija - Prokuplje - Kocani - Nis

6. Stalac - Krusevac; extension to Rankovicevo near completion

7. Caribrod - Pirot - Nis

8. Nis - Knjazevac - Zajecar - Negotin - Prahovo

9. Topcider - Mala Krsna - Pozarevac - Kucevo

10. Pozarevac - Klenovnik

11. Smederevo - Mala Krsna - Velika Plana

12. Mramorak - Vrsac - Alibunar - Petrovo Selo - Pancevo - Belgrade

13. Bazjas - Vrsac

14. Secanj - Boka - Samos - Alibunar

15. Sirig - Velika Kikinda - Becej - Petrovgrad - Orlovat - Kovacica - Pancevo

16. Petrovo Selo - Kovin

17. Pancevo - Kovin

18. Kovacica - Perlez

19. Orlovak - Titel - Novi Sad

20. Ruma - Klenak - Sabac

21. Indjija - Novi Sad - Subotica - Kelebija

22. Ruma - Vrdnik

23. Petrovaradin - Beocin

24. Jam - Jasenovo - Vrsac

25. Sent Hubert - Velika Kikinda

26. Horgos - Subotica

27. Subotica - Senta - Ada - Becej - Curug - Temerin - Novi Sad

28. Becej - Vrbas

29. Bezdan - Sombor - Bogojevo - Dalj - Vukovar - Vinkovci

30. Sombor - Subotica

31. Sombor - Brestovac - Odzaci - Palanka

32. Palanka - Kula - Sekic

33. Kula - Pacir - Subotica

34. Sid - Raca

35. Tovarnik - Vukovar - Dalj - Osijek - Manastir

36. Vinkovci - Brcko

37. Vukovar - Osijek

38. Osijek - Djakovo - Vrpolje - Samac

39. Osijek - Nasice

40. Slavonski Brod - Bosanski Brod

41. Novska - Dugo Selo - Zagreb

42. Novska - Sunja - Sisak - Zagreb

43. Sunja - Kostajnica - Bosanski Novi - Prijedor - Banja Luka

44. Bosanski Novi - Krupa - Bihac - Knin

45. Osijek - Slatina - Virovitica - Koprivnica

46. Djekenjes - Koprivnica - Dugo Selo - Zagreb

47. Koprivnica - Varazdin

48. Donja Lendava - Cakovec - Varazdin

49. Cakovec - Ormoz - Ptuj - Maribor

50. Krapina - Rogatec - Grobeljno - Celje

51. Zagreb - Karlovac - Ogulin - Delnice - Susak - Rijeka - Kastav - Sv. Petar - Trieste

52. Ogulin - Gospic - Knin - Perkovic - Split

53. Perkovic - Sibenik

54. Zagreb - Varazdin - Cakovec - Kotoriba

55. Murska Sobota - Lutomer - Ormoz - Varazdin

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56. Ljubljana - Jasenice

57. Sv. Petar - Logatec - Ljubljana

58. Sv. Petar - Pazin - Pula

59. Ljubljana - Kamnik

60. Ljubljana - Postojna - Sveti Petar - Kastav - Rijeka

61. Kranj - Trzic

62. Bohinj - Bled - Planica

63. Sarajevo - Doboj - Samac

64. Brcko - Tinja - Tuzla - Luk Matijevci.

c. 760-millimeter Narrow-gauge Lines

1. Metkovic - Mostar - Sarajevo - Ustripaca - Visegrad - Uzice - Cacak - Rankovicevo - Krusevac - Stalac - Paracin - Boljevac - Metovnica - Zajecar

2. Metovnica - Bor

3. Ustipraca - Foca

4. Split - Sinj

5. Sarajevo - Doboj - Bosanski Brod - Slavonski Brod

6. Doboj - Tuzla

7. Visoko - Vares

8. Dobrljin - Knin, the former Sipad railroads with an auxiliary net for lumbering

9. Railroads of the "Bosna DD" Enterprise, starting from the suburbs of Banja Luka, also with a net for lumbering

10. Prijedor - Sanski Most - Jasenovac - Knin

11. Jajce - Travnik - Sarajevo

12. Line for lumbering in the Zavidovici - Orlovo - Poddzeplje forest area

13. Metkovic - Hum - Bileca - Gruz

14. Hum - Trebinje - Bileca - Trubelj - Niksic - Danilovgrad - Podgorica [Titograd?] - Plavnica

15. Bar - Virpazar, 750 millimeters

16. Klarja - Grnja - Petrovgrad

17. Belgrade - Obrenovac - Lajkovac - Valjevo

18. Lajkovac - Gornji Milanovac - Cacak

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19. Mladenovac - Arandjelovac - Lajkovac

20. Sabac - Banja Koviljaca

21. Ustripaca - Priboj

22. Dubravica - Pozarevac

23. Pozarevac - Petrovac na Mlavi

24. Poljcane - Zrece

25. Nasicka line: Novoselac - Kriz - Suzsine - Djurdjenovac

26. The Slevekov railroads: Okucani - Pakrac - Kamensko via Pozega, a total of 250 kilometers

27. The Slavonian - Podravske (Drava Valley) railroad, track 1,000 millimeters wide and 180 kilometers long.

d. 600-millimeter Narrow-gauge Lines

1. General Hanris - Tetovo - Gostivar - Kicevo - Ohrid

2. Ohrid - Struga

3. Gracko - Prilep

4. Track belonging to the Dajc Enterprise in Turopolje and the Mirna coal mine in Brega, totaling 15 kilometers.

The entire railroad net has been nationalized, regardless of whether administered by the federal, provincial, banovina, or district authorities or by private enterprise before the war.

Types of Repairs

"Major inspection and repairs No II" (GR II) indicates the heaviest repairs, which are made on a locomotive after 6 years of continuous service, or about 120,000 kilometers. This work includes replacement of the firebox and patching up to 50 percent of the boiler, as well as work on the running gear, involving replacement of machinery and equipment.

"Major inspection and repair No I" (GR I) includes patching in the firebox amounting to 50 percent, and patching of the boiler amounting to 25 percent of its surface. This is done after 80,000 kilometers, which means after 3½ to 4½ years.

"Major repairs to locomotives" (GO) includes work on up to 25 percent of the firebox and patching of up to 15 percent of the boiler.

Railroad Workshops and Their Capacity

1. Maribor: GO, Gr I, and II; repairs or overhauls 20 locomotives per month, and does major repairs on or overhauls 400 cars per month.

2. Zagreb: same capacity as Maribor

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3. Zrenjanin: GO and GR I, eight locomotives, no railroad cars.

4. Subotica: GO and GR I and II, 12 locomotives and 200 railroad cars.

5. Nis: GO and GR I and II, 22 locomotives and 600 freight cars.

6. Smederevo: no locomotives, but 450 railroad cars per month.

7. Veles: no locomotives, but 180 railroad cars per month.

8. Brod on the Sava: GO and GR I, ten locomotives and 150 railroad cars per month.

All the above eight workshops repair standard-gauge locomotives and freight cars.

9. Sarajevo: GO and GR I and II, 20 locomotives and 400 railroad cars per month. This workshop repairs locomotives and railroad cars of 760-millimeter gauge. The larger workshops also help repair rolling stock of this gauge, especially the Rankovicevo railroad yard, which repairs only railroad cars in the standard-gauge field, as its installations for the repair of locomotives were dismantled and carried off to Germany during the occupation. This workshop is probably now equipped to repair 28-30 locomotives per month (both gauges) and 750-800 railroad cars per month (both gauges).

There is a bridge workshop at Crveni Krst near Nis which is equipped to maintain and repair all railroad bridges in Yugoslavia.

The Veles workshop is administratively a part of the Nis railroad workshop. The following railroad workshops are independent: Maribor, Zagreb, Zrenjanin, Subotica, Nis, Smederevo, Sarajevo, Rankovicevo, and Crveni Krst. The workshop at Brod on the Sava is administratively under the railroad yard administration at Brod on the Sava.

Railroad Yards

Before the war there were 52 railroad yards: Maribor, Ljubljana I, Ljubljana II, Zagreb, Sisak, Slovenski /Slavonski?/ Brod, Novska, Karlovac, Ogulin, Srpske Moravice, Gracac, Split, Susak, Varazdin, Banja Luka, Prijedor, Bosanski Novi, Bihac, Osijek, Bjelovar, Pakrac, Virovitica, Vinkovci, Subotica, Senta, Novi Sad, Kikinda, Zrenjanin, Indjija, Zemun, Belgrade, Cuprija, Crveni Krst, Zajecar, Krusevac, Kraljevo (now Rankovicevo), Smederevo, Mladenovac, Lapovo, Paracin, Skoplje, Bosanski Brod, Sarajevo, Konjic, Uzice, Mostar, Visegrad, Zenica, Cacak, Niksic, Prilep, and General Hanris.

Besides these railroad yards, there are also subordinate yards which are under the jurisdiction of other railroad yards. For example, the Jasenice yard is under Ljubljana II; Koprivnica is under Zagreb; Knin and Sibenik are under Split; Bihac and Sunj are under Banja Luka, Nasice and Beli Manastir are under Osijek; Mladenovac and Pozarevac are under Belgrade; Ruma is under Zemun; Caribrod is under Crveni Krst; Knjazevac is under Zajecar; and Kosovska Mitrovica, Djevdjelija, Veles, and the Pec locomotive station are under Skoplje.

Railroad Car Factories and their Capacities

1. The railroad car factory in Slavonski Brod makes four-axle and two-axle passenger cars and also builds freight cars. Its capacity depends primarily on the orders received and on the possibility of procuring the necessary materials, and secondly on the number of skilled workers and the number of installations available. The first three factors are variable; the fourth is constant. The present capacity is four four-axle and eight two-axle passenger cars, and 60 freight cars per month, on the basis of an 8-hour workday.

2. Sardit in Smederevo works exclusively on freight cars and has a monthly capacity of 50 cars.

3. Jasenica in Smederevska Palanka has a monthly capacity similar to that of Slavonski Brod, as far as cars are concerned.

4. The Krusevac railroad car factory specializes in the manufacture of freight cars and has a capacity of 70 cars per month.

Locomotive Factories

The only locomotive factory in Yugoslavia is located in Slavonski Brod.

Boilers and fireboxes, axles and wheels, tires, and other materials are procured abroad. Two to two and one-half locomotives per month can be assembled here.

The Sartid Factory in Smederevo has not been able, even if this were desired, to equip itself for the production of locomotives, because of the urgent demand for the construction of parts for bridges. It is not known whether the factory is now able to build locomotives.

Coal

Yugoslavia produces three kinds of coal, bituminous, with a calorific value of 6,000 to 7,500 calories, from the Zajecar (Timok), Central Bosnian, and Western Dalmatian coal basins; brown coal, with a calorific value of 4,500 to 5,000 calories, from the Trbovlje, Northern Bosnian and Central Serbian fields; and lignite, with a calorific value of 2,000 to 3,500 calories, scattered throughout Yugoslavia, the most important deposits being in the Pozarevac and Drina Valley basins.

Express, passenger, express freight, and freight trains use a mixture of bituminous and brown coal in a ratio of 1:2 or 1:3.

Bituminous coal is not considered for use by itself, as orders for locomotives are always based on an average calorific value of 4,500 calories. Also, Yugoslav bituminous coal contains a high percentage of sulfur, which corrodes the copper grates of the fireboxes, the smoke system, and the hot-water tubes.

After a drying process, the lignites are used primarily in stationary boilers, and to some extent by the classification service. In certain cases they are mixed with brown coal in a ratio of 1:1 for light freight trains on short hauls and for local passenger trains.

Yugoslav coals also are unsuitable for long storage because of their high sulfur content, which often causes spontaneous combustion in the bins.

Black coals have been procured as a war reserve from the Saar, Ruhr, and Upper Silesian coal fields. Experiments have been made with Yugoslav briquettes. These have proved excellent in respect to calorific value, but they cannot be considered as permanent reserves because of their instability and tendency to turn into dust after a certain length of time. Consequently, the railroad authorities have been purchasing about 120,000 to 150,000 tons of coal from the Saar, Ruhr, and Upper Styrian [sic] coal fields per year.

Tie-Impregnation Trains

The Yugoslav Railroad Administration has been experimenting with two railroad trains equipped for tie-impregnation. The purpose of the experiments was to discover whether it is practical and economical to use this method along with or in place of the old system. Both standard-gauge and narrow-gauge railroad ties figure in the experiments. One train was sent toward Belgrade, the other toward Zagreb.

The existing stationary installations have been operating by vacuum, using petroleum. The new mobile plants operate according to the Riedl system, with vacuum chambers into which, after processing by vacuum produced by compressors, special salts are introduced. The advantage of the permanent installations is their larger capacity. However, because of the high cost of transportation, ties awaiting impregnation from almost the entire country are dumped at three impregnation centers, Sarajevo, Zagreb, and Belgrade.

The advantage of the mobile impregnation trains theoretically is the avoidance of transport costs for transporting the ties, as the mobile installations visit the smaller centers where the ties are ready for impregnation or for laying on the track.

According to comparative studies which have not been conclusively finished because of the outbreak of World War II, the mobile impregnation plant is highly satisfactory because of the low cost of impregnation per piece and because of the acceleration of the procedure, also an important consideration, which it makes possible.

Another advantage is the possibility of obviating imports of petroleum and equipment, since it has been possible to purchase the patent and equipment necessary for production in Yugoslavia.

Indications of Increase in Rolling Stock Park

The locomotive and railroad car park has increased as a result of reparations deliveries from Hungar, acquisition of German war booty, and the purchase of 75 locomotives from Austria.

Better maintenance of the rolling stock, resulting from the adoption of a continuous 12- or 24-hour day, better repairs, and better maintenance of railroad equipment has increased the percentage of rolling stock exploitation by 15 to 20 percent. The maintenance of railroad equipment, installations, and rolling stock has also improved.

Railroad Bridges

1. Standard-gauge

The following railroad bridges are open to rail and highway traffic: the Pancevo bridge over the Danube, the bridge between Slavonski Brod and Bosanski Brod, the bridge near Stalac over the Morava, the bridge near Krusevac over the Morava, and the bridge on the Pozarevac line over the Morava near Ljubicevo.

Bridges for combined railroad and highway traffic are 9 meters wide. Standard-gauge railroad bridges are 4.5 meters wide, bridges for 760-millimeter track are 3 meters wide, and bridges for 600-millimeter track are 2.5 meters wide.

All other specifications of the internal profile correspond fully with the dimensions prescribed by the International Railroad Union, which are effective for all countries except those which are not members, such as the US and the USSR.

There is no single type of railroad bridge; new plans are drawn up for each project. Only the double /not further explained/ movable railroad bridges are standardized. They are of the Kohn and Rotwagner types, made in Austria.

The lengths of the various iron bridges are as follows: Pancevo 1,000 meters, Zemun 500 meters, Raljski Viaduct 250 meters and height above ground level about 40 meters, the bridge near Cuprija over the Morava 400 meters, the bridge over the Morava between Stalac and Aleksinac 300 meters, the bridge over the Morava near Supovac 300 meters, the bridge over the Nisava at Nis 60 meters, the bridge over the Juzna Morava near Kurvingrad 150 meters, the bridge over the Morava near Grdelica 120 meters, the bridge near Dzep 120 meters, the bridge near Priboj 100 meters, the bridge over the Vardar near Skoplje 150 meters, the two railroad bridges over the Vardar 100 meters each and one kilometer apart, the bridge near Demir Kapija 100 meters, the bridge near Strumica 150 meters, the bridge over the Zapadna Morava on the Kragujevac - Rankovicevo line near the village of Sirca with a high embanked approach (this bridge is two-level, highway below and railroad above) 80 meters, the bridge over the Ibar near Mataruska Banja 120 meters, two bridges near the mouth of the Ibar with a tunnel between 100 meters each, the bridges near Slatina and Balaban 100 meters each, three bridges on the Nis - Pirot line over the Nisava at Sicevacka Klisura 60 meters each, the bridge on the Pozarevac line near Ljubicevo 200 meters, the bridge over the Tisa on the Titel - Orlovat line 300 meters, the bridge over the Danube near Petrovaradin 800 meters, the bridge over the Danube near Bogojevo 800 meters, the bridge near Osijek over the Drava 300 meters, the bridge near Jasenovac over the Sava 600 meters, the bridge over the Sava near Zagreb 500 meters, and the following bridges on the Zagreb - Susak and Srpske Moravice - Split lines -- the bridge over the Kupa near Karlovac 100 meters, the bridge over the Globornica between Generalski Stol and Donja Dubrava 120 meters and 30 meters above ground level, the bridge over the Licanka near Fuzine 50 meters, the bridge near Plaski 50 meters, the bridge near Lovinac 60 meters, the bridge over the Strug (a backwater of the Sava between Novska and Jasenovac) 120 meters, the bridge over the Sava between Jasenovac and Dubica 250 meters, the bridge over the Kupa between Sisak and Caprag 100 meters, and the bridge over the Bedinja near Varazdin 30 meters.

There are nine railroad bridges of concrete, each 60 meters long, on the Nis - Zajecar - Prahovo line between Svrljig and Knjazevac.

Each span of the Triangle Bridge near Zidani Most, of stone on stone piers, is 100 meters long.

The Borovnica Viaduct near Ljubljana is three-level; its height above ground level is 100 meters, length 500 meters; it has stone piers of masonry construction and brick arches.

2. 760-millimeter Narrow-gauge

The following bridges are of iron:

The bridge over the Timok near Zajecar 120 meters, the bridge over the Krivovirski Timok near Bezdan 150 meters, the bridge over the Krivovirski Timok between Valakonja and Boljevac 200 meters, the bridge over the Grza near Paracin 60 meters, the joint bridge over the Morava between Stalac and Krusevac for standard-gauge and 760-millimeter (third rail) as well as highway 300 meters, the bridge over the Ibar near Rankovicevo 150 meters, the bridge over the Zapadna Morava near Cacak 180 meters, two bridges over the Zapadna Morava between Cacak and Pozega 120 meters each, seven bridges of 50 to 60 meters each over the Djetina between Uzice and Kremen, the bridge past Sargan over the Drina 100 meters, the bridge over the Neretva near Mostar 100 meters, the bridge near Konjic 100 meters, the bridge over the Neretva near Metkovic 200 meters, six bridges on the Sarajevo - Doboj line over the Bosna 100 to 200 meters each.

All other 760- and 600-millimeter bridges are of minor importance.

All the bridges except Zidani Most and the Borovnica Viaduct, which are on double-track lines, were planned for single track.

Tunnels

All tunnels, whether for 1,435- or 760-millimeter gauge, are single-track, except those on the Spilje - Zidani Most - Ljubljana - Rakek line.

The length of the tunnels varies from 2,000 to 5,000 meters. The width corresponds to the specifications drawn up for all European railroad tracks.

Details on the tunnels are not given, as it is considered impractical to attempt to neutralize such installations from the air.

Terminal Networks

The chief terminal networks in Yugoslavia are the following: Zidani Most, Zagreb, Ljubljana, Slavonski Brod, Vinkovci, Indjija, Novi Sad, Subotica, Belgrade, Pancevo, Zrenjanin, Lapovo, Mala Krsna, Paracin, Stalac, Rankovicevo, Nis, Skoplje, Veles, Cacak, Ustripaca, and Sarajevo.

These are not suitable targets from either a psychological or economic point of view.

This also applies to water pumps, the principal ones of which are located at Maribor, Ljubljana I and II, Dravograd, Celje, Zidani Most, Jasenice, Kocevje, Ptuj, Sevnica, Dabova, Zapresic, Zagreb, Dugo Selo, Maslovina, Popovaca, Novska, Nova Gradiska, Nova Kapela, Batrina, Slavonski Brod, Vinkovci, Sremska Mitrovica, Karlovac, Generalski Stol, Ogulin, Srpske Moravice, Skrad, Fuzine, Susak, Rudo Polje, Plitvicka Jezera, Vrhovine, Lovinec, Knin, Perkovic, Slivno, Split, Sibenik, Sinj, Klis, Sisak, Sunja, Bosanski Novi, Prijedor, Piskavica, Krupa, Bihac, Banja Luka, Zabok, Krapinske Toplice, Varazdin, Krizevci, Koprivnica, Bjelovar, Virovitica, Nasice, Osijek, Batina, Skrila, Slavonska Pozega, Sombor, Bezdan, Bajmok, Pacir, Subotica, Zednik, Cantavir, Backa Topola, Kula Senta, Stara Kanjiza, Horgos, Velika Kikinda, Stari Becej, Stari Vrbas, Temerin, Novi Sad, Petrovaradin, Titel, Backa Palanka, Vukovar, Sid, Sremska Mitrovica, Ruma, Indjija, Zemun, Belgrade, Topcider, Mladenovac, Palanka, Lapovo, Jagodina, Cuprija, Paracin, Stalac, Aleksinac, Crveni Krst, Nis, Leskovac, Dzep, Vranje,

Ristovac, Kumanovo, Skoplje, Zelenikovo, Veles, Gradsko, Djevdjelija, Bitolj, Prilep, Stip, Djeneral Haris, Tetovo, Gostivar, Kicevo, Ohrid, Struga, Bela Palanka, Pirot, Caribrod, Svrljig, Knjazevac, Carevo Selo, Vratarnica, Zajecar, Negotin, Prahovo, Metovnica, Krivi Vrh, Sv. Petka, Paracin, Krusevac, Trstenik, Rankovicevo, Cacak, Pozega, Uzice, Visegard, Konjic, Mostar, etc.

Specifications

On the main lines the "naponika" [pressure?] capacity is 4 to 5 cubic meters per minute. On the other lines it varies from one to 3 cubic meters per minute.

All the new strategic railroad lines built in Serbia and elsewhere in Yugoslavia can support 24 pairs of trains in 24 hours, i.e. 24 trains going in each of two directions, or a total of 48. These lines include Belgrade - Pancevo, Topcider - Kucevo, Lapovo - Kragujevac - Rankovicevo - Skoplje, Nis - Projuplje - Pristina - Pec, Bihac - Knin, Nis - Zajecar - Prahovo, Paracin - Zajecar, Stalac - Visegrad, and Belgrade - Lajkovac - Cacak.

All 1,435- and 760-millimeter lines, except the main lines, have a capacity of 24 pairs of trains every 24 hours.

The main arteries Caribrod - Nis - Belgrade - Indjija - Subotica, and Indjija - Zagreb - Ljubljana, including the branch lines Zidani Most - Spilje, Ljubljana - Jasenica, and Ljubljana - Rakek, can handle 36 pairs of trains every 24 hours. The specifications are: train length 110 axles, average speed 30 kilometers per hour, weight of train 600 tons, and overloading 10 percent, as compared with the specifications in the railroad schedule. In practice, 110 axles correspond to 55 G or H cars weighing about 7,800 kilograms empty. On the basis of 40 soldiers per car, these 55 cars can carry 2,200 soldiers. Their average weight under arms and with full equipment is reckoned at 100 kilograms per soldier, or 220 tons. Fifty-five cars weighing 7.8 tons total 429 + 220 = 649 [long] tons, which means that the weight of this troop train is within the limits permitted.

Before World War II, calculations in Yugoslavia were based on an average speed of between 35 and 40 kilometers per hour. Today, it must be assumed that both the military and railroad authorities calculate on the basis of 40 kilometers per hour, but keep the other specifications the same as above.

On the main arteries an axle pressure of 18 tons is permissible. On the other standard-gauge lines the permissible axle pressure varies from 9 to 15.5 tons. In the case of the "vicinalne" [local?] lines in the Banat, the Backa, and northeastern Croatia, the permissible axle pressure varies from 9 to 12 tons. An axle pressure of 9 to 12 tons is also permitted for 760-millimeter track.

The rails used for main arteries weigh from 38 to 42 kilograms per linear meter. Rails for other standard-gauge tracks weigh 28 to 35 kilograms per linear meter, while rails for standard-gauge "vicinalne" lines weigh 20 to 28 kilograms per linear meter. Rails for 760-millimeter track weigh 15 to 20 kilograms per linear meter.

All stations for all three gauges have loading ramps which meet the requirements of peacetime transportation.

Before the war the stations in railroad yards and the larger stations elsewhere were equipped with loading ramps suitable for military use.

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For the heaviest loading and unloading operations in all stations, plans have been drawn up for using wooden loading ramps. These are strongly and simply built. They are movable and are set up beside each boxcar, gondola car, or hopper car.

Strategic Importance of the Yugoslav Railroads

The military and strategic importance of the Yugoslav railroads, insofar as the capacity of the lines is concerned, has been increased, although that of the Belgrade - Novska line has been reduced, as described above. Consequently, the transport of Yugolsav troops, for reasons of mobilization or concentration, can be effected in a somewhat shorter time than was required in 1941.

According to plans drawn up in 1940 by the Royal Yugoslav Main General Staff, such transport was scheduled to require 28 days.

In any case, and especially considering the changed situation in respect to frontier treaties, it should be assumed that /even/ under the most unfavorable conditions, such movements will be carried out in 20 to 22 days.

Locomotives, the railroad car park, rails and roadbeds, bridges, tunnels, and other railroad objects, railroad yard and workshop equipment, station and water station installations and equipment, and section and bridge units in their present condition fulfill all the prerequisites for handling a minimum of 24 or 36 pairs of trains in 24 hours. On the basis of this assumption, troops can be transported in 20 to 22 days. Even the above figures one can calculate how many trains would be needed for concentration shipping.

The most effective and humane method the Western Allies could use to prevent shipping for purposes of mobilization or concentration would be to knock out the most important bridges and viaducts by aerial bombardment.

The following railroad bridges could be knocked out in a single day: Zidani Most, Zagreb, Bosanski Brod, Belgrade, Novi Sad, Ralja, Beli Potok, Cuprija, Rankovicevo, Skoplje, etc. About 10 days would be required under the most nearly normal conditions for setting up temporary military railroad bridges. If this were done, the mission would be achieved, the population would not be injured, and the Allies would not be regarded as enemies but as considerate liberators.

The adoption of the old methods of destroying workshops, railroad yards, stations, and unimportant installations would involve little military advantage and would cause great psychological damage.

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